

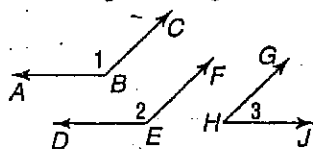
# 2-8 Study Guide and Intervention (continued)

## Proving Angle Relationships

**Congruent and Right Angles** Three properties of angles can be proved as theorems.

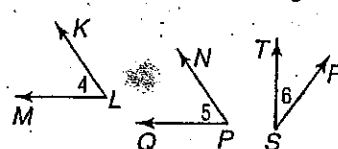
Congruence of angles is reflexive, symmetric, and transitive.

Angles supplementary to the same angle or to congruent angles are congruent.



If  $\angle 1$  and  $\angle 2$  are supplementary to  $\angle 3$ , then  $\angle 1 \cong \angle 2$ .

Angles complementary to the same angle or to congruent angles are congruent.



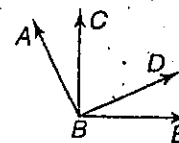
If  $\angle 4$  and  $\angle 5$  are complementary to  $\angle 6$ , then  $\angle 4 \cong \angle 5$ .

### Example

Write a two-column proof.

**Given:**  $\angle ABC$  and  $\angle CBD$  are complementary.  
 $\angle DBE$  and  $\angle CBD$  form a right angle.

**Prove:**  $\angle ABC \cong \angle DBE$



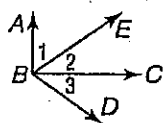
Statements	Reasons
1. $\angle ABC$ and $\angle CBD$ are complementary. $\angle DBE$ and $\angle CBD$ form a right angle.	1. Given
2. $\angle DBE$ and $\angle CBD$ are complementary.	2. Complement Theorem
3. $\angle ABC \cong \angle DBE$	3. Angles complementary to the same $\angle$ are $\cong$ .

### Exercises

Complete each proof.

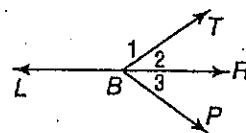
1. **Given:**  $\overline{AB} \perp \overline{BC}$ ;  
 $\angle 1$  and  $\angle 3$  are complementary.

**Prove:**  $\angle 2 \cong \angle 3$



Statements	Reasons
a. $\overline{AB} \perp \overline{BC}$	a. _____
b. _____	b. Definition of $\perp$
c. $m\angle 1 + m\angle 2 = m\angle ABC$	c. _____
d. $\angle 1$ and $\angle 2$ form a rt $\angle$ .	d. <u>substitution</u>
e. $\angle 1$ and $\angle 2$ are compl.	e. _____
f. _____	f. Given
g. $\angle 2 \cong \angle 3$	g. _____

2. **Given:**  $\angle 1$  and  $\angle 2$  form a linear pair.  
 $m\angle 1 + m\angle 3 = 180$   
**Prove:**  $\angle 2 \cong \angle 3$



Statements	Reasons
a. $\angle 1$ and $\angle 2$ form a linear pair. $m\angle 1 + m\angle 3 = 180$	a. Given
b. _____	b. Suppl. Theorem
c. $\angle 1$ is suppl. to $\angle 3$ .	c. _____
d. _____	d. $\angle$ suppl. to the same $\angle$ are $\cong$ .

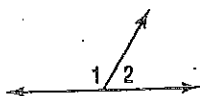
# 2-8

## Skills Practice

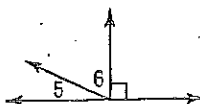
### Proving Angle Relationships

Find the measure of each numbered angle.

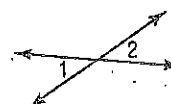
1.  $m\angle 2 = 57$



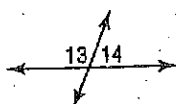
2.  $m\angle 5 = 22$



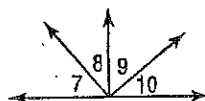
3.  $m\angle 1 = 38$



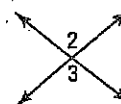
4.  $m\angle 13 = 4x + 11$ ,  
 $m\angle 14 = 3x + 1$



5.  $\angle 9$  and  $\angle 10$  are  
complementary.  
 $\angle 7 \cong \angle 9$ ,  $m\angle 8 = 41$



6.  $m\angle 2 = 4x - 26$ ,  
 $m\angle 3 = 3x + 4$



Determine whether the following statements are *always*, *sometimes*, or *never* true.

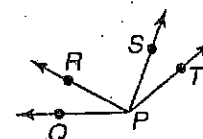
7. Two angles that are supplementary form a linear pair.
8. Two angles that are vertical are adjacent.

9. Copy and complete the following proof.

Given:  $\angle QPS \cong \angle TPR$

Prove:  $\angle QPR \cong \angle TPS$

Proof:



Statements

Reasons

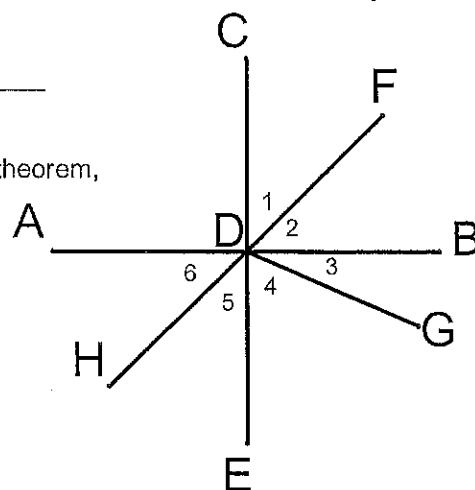
- a. \_\_\_\_\_
- b.  $m\angle QPS = m\angle TPR$
- c.  $m\angle QPS = m\angle QPR + m\angle RPS$   
 $m\angle TPR = m\angle TPS + m\angle RPS$
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_
- g. \_\_\_\_\_

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. Substitution
- e. \_\_\_\_\_
- f. \_\_\_\_\_
- g. \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_  
202 Chapter 2 Worksheet

Justify the following statements with a definition, postulate, property, theorem, etc...

1. \_\_\_\_\_  $AD + DB = AB$
2. \_\_\_\_\_  $m\angle 1 + m\angle 2 = m\angle CDB$
3. \_\_\_\_\_ If  $AD = BD$  and  $CD = DE$ ,  
then  $AD + CD = BD + CE$ .
4. \_\_\_\_\_  $\angle 2 \cong \angle 6$
5. \_\_\_\_\_ If  $\overline{DF}$  bisects  $\angle CDB$ , then  $m\angle 1 = m\angle 2$ .
6. \_\_\_\_\_ If  $D$  is the midpoint of  $AB$ , then  $AD = DB$ .
7. \_\_\_\_\_ If  $CD \perp AB$ , then  $\angle CDB$  is a right angle.
8. \_\_\_\_\_ If  $\angle CDB$  is a right angle,  $m\angle CDB = 90$ .
9. \_\_\_\_\_ Look at the picture,  $\angle ADF$  and  $\angle FDB$  are supplementary.
10. \_\_\_\_\_ If #9 is true, then  $m\angle ADF + m\angle FDB = 180$ .
11. \_\_\_\_\_ If  $m\angle 1 + m\angle 2 = 90$ , then  $\angle 1$  and  $\angle 2$  are complementary.
12. \_\_\_\_\_ If  $\angle 4$  and  $\angle 5$  are complementary and  $\angle 6$  and  $\angle 5$  are complementary, then  $\angle 4 \cong \angle 6$ .
13. \_\_\_\_\_ If  $\angle 1$  and  $\angle 2$  are supplementary and  $\angle 2$  and  $\angle 3$  are supplementary, then  $\angle 1 \cong \angle 3$ .

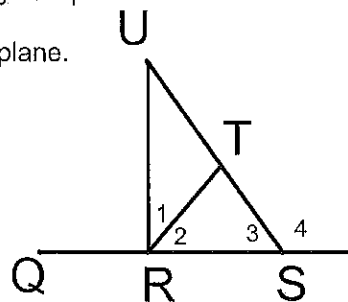


Complete with always, sometimes, or never.

14. Two points \_\_\_\_\_ lie in exactly one line.
15. Three points \_\_\_\_\_ lie in exactly one line.
16. Three points \_\_\_\_\_ lie in exactly one plane.
17. Three collinear points \_\_\_\_\_ lie in exactly one plane.
18. Two planes \_\_\_\_\_ intersect.
19. Two intersecting planes \_\_\_\_\_ intersect in exactly one point.
20. Two intersecting lines \_\_\_\_\_ intersect in exactly one point.
21. Two lines \_\_\_\_\_ intersect in exactly one point.
22. Two intersecting lines \_\_\_\_\_ lie in exactly one plane.

Write proofs for the following problems.

23. Given:  $\angle 2$  and  $\angle 4$  are supplementary  
Prove:  $\angle 2 \cong \angle 3$



24. Given:  $\angle 1 \cong \angle 2$ ;  $\angle 3 \cong \angle 4$   
Prove:  $\angle ABC \cong \angle DEF$

